

# STP Overview

04 Mar 2015

Brief to NCEI Deputy Director



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# OUTLINE

## Solar & Terrestrial Physics Division

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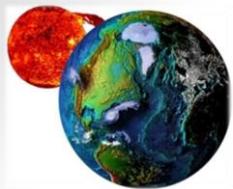
→ STP Division Overview

Technical Teams

Personnel Accomplishments

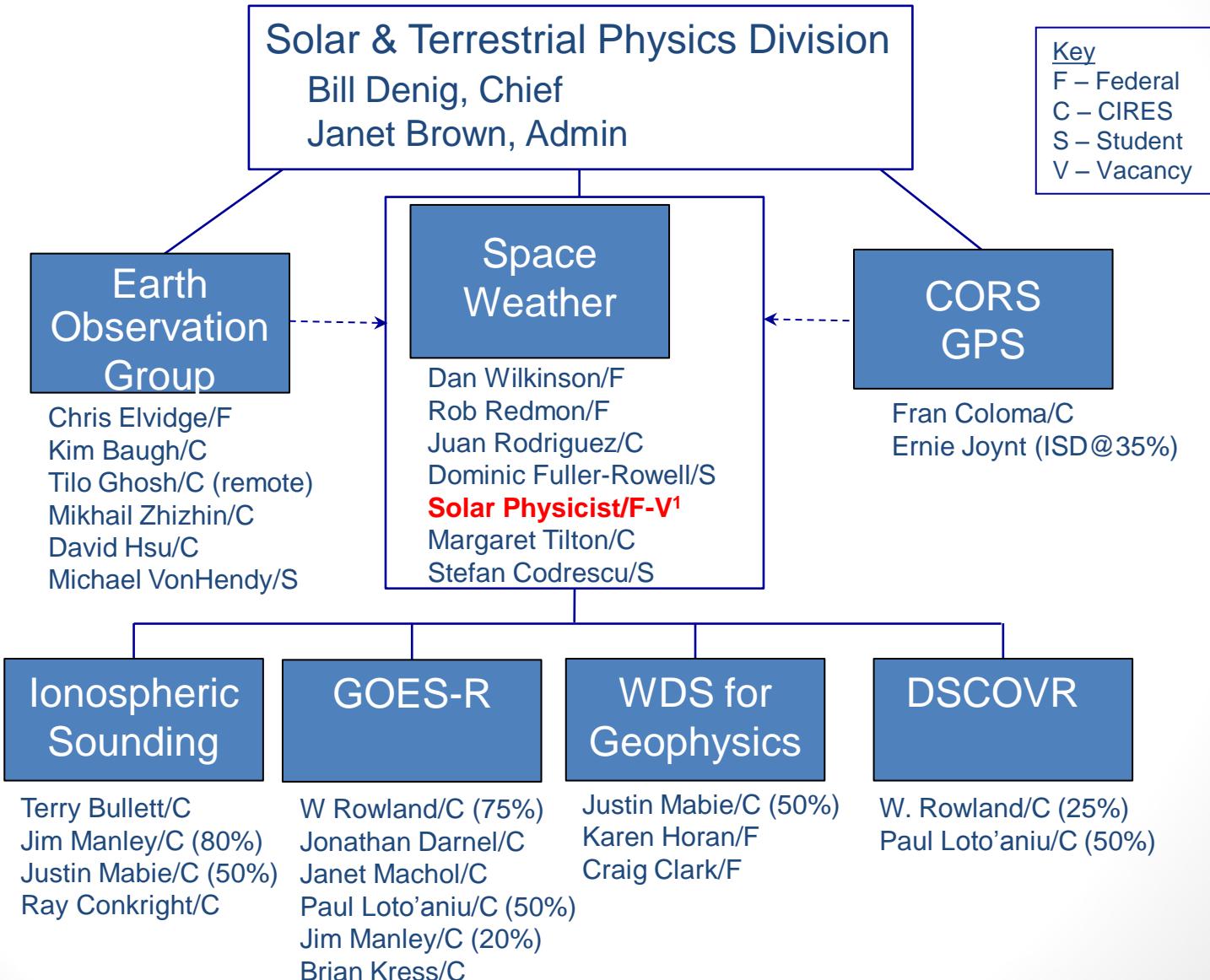
Division Publications

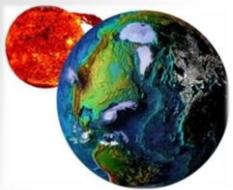
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# STP Division Overview

## STP Organizational Chart

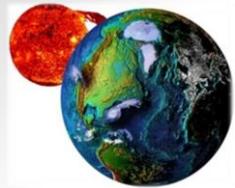




# STP Division Overview

## Brief Retrospective

- 1942 Interservice Radio Propagation Laboratory (IRPL) formed at NBS (DOC) in Washington D.C.
- 1946 Central Radio Propagation Laboratory (CRPL) formed to replace IRPL
- 1957 World Data Center A (WDC-A) established in CRPL
- 1965 Environmental Sciences Services Administration (ESSA) formed to include CRPL and the Environmental Research Laboratories (ERL)
- 1966 Aeronomy and Space Data Center (ASDC) established under the Space Dynamics Laboratory (SDL) within ERL
- 1970 NOAA established within DOC
- 1972 National Geophysical and Solar and Terrestrial Data Center (NGSDC) formed to include the **Solar and Terrestrial Physics (STP) Division**
- 1973 NGSDC assigned responsibility for archive of GOES and TIROS space environmental data
- 1982 NGSDC renamed the National Geophysical Data Center (NGDC)
- 2011 WDC(-A) for STP merges with the WDC for Geophysics and Marine Geology to become the World Data Service for Geophysics
- 2012 STP assumes responsibilities from SWPC for supporting the GOES-R space weather sensors acquisition and operations
- 2014 NGDC assigned responsibility for the archive of DSCOVR solar wind data
- 2015 NGDC merges with other NOAA Data Centers to become the Nation Center for Environment Information (NCEI); STP transitions to the Solar Geophysics Branch (SGB) within the Geophysical Science Division (GSD) of the Center for Coasts, Oceans and Geophysics (CCOG)



# STP Division Overview

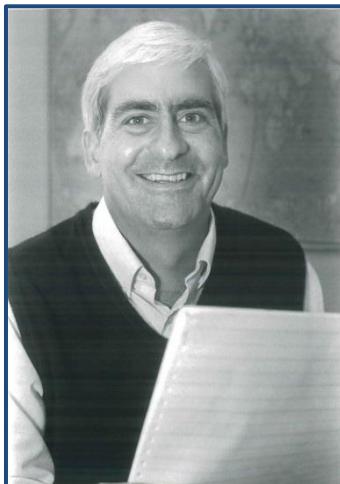
## STP Chiefs / Directors WDC-A for STP



**Virginia Lincoln (1972-1981)**



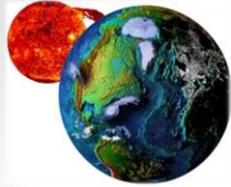
**Joe Allen (1981-1995)**



**Herb Kroehl (1995-2004)**



**Bill Denig (2005-2015)**



# OUTLINE

## Solar & Terrestrial Physics Division

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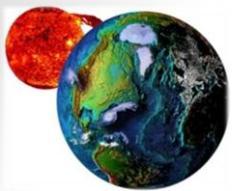
STP Division Overview

→ Technical Teams

Personnel Accomplishments

Division Publications

End



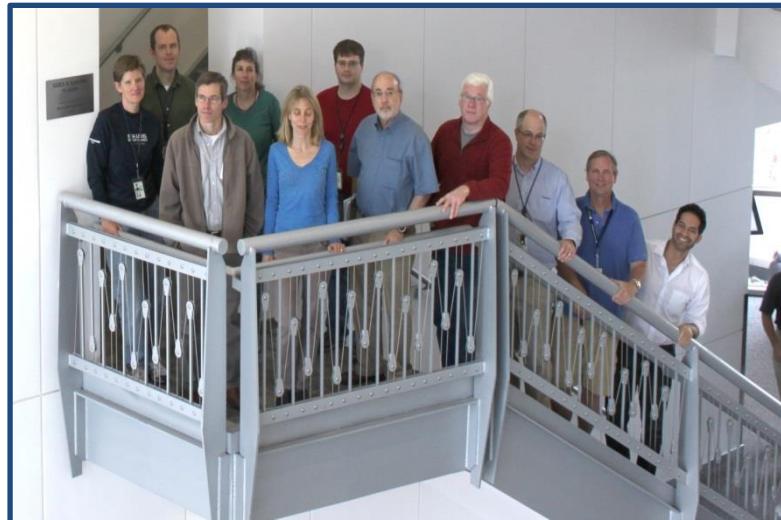
# Space Weather Team

**Mission:** *Provide Long-Term Scientific Stewardship for NOAA Space Weather (SWx) Data and Information*

Supporting NOAA's satellite acquisition,  
pre/post launch operations and space  
environmental monitoring program

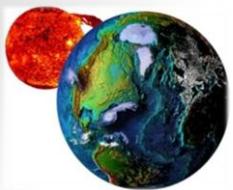
## Actions:

- Manage the 30+ year historical record of space environmental data from GOES and POES (also DMSP).
- Develop ground processing algorithms for producing operational space weather products for GOES-R.
- Assume responsibility for the satellite sensor cal-val and monitor in-flight performance and calibration (SWx).
- Plan for the acquisition and archive of DSCOVR space weather products.
- Cross-LO team – NESDIS/NGDC and NWS/SWPC



## Supporting Satellite Programs:

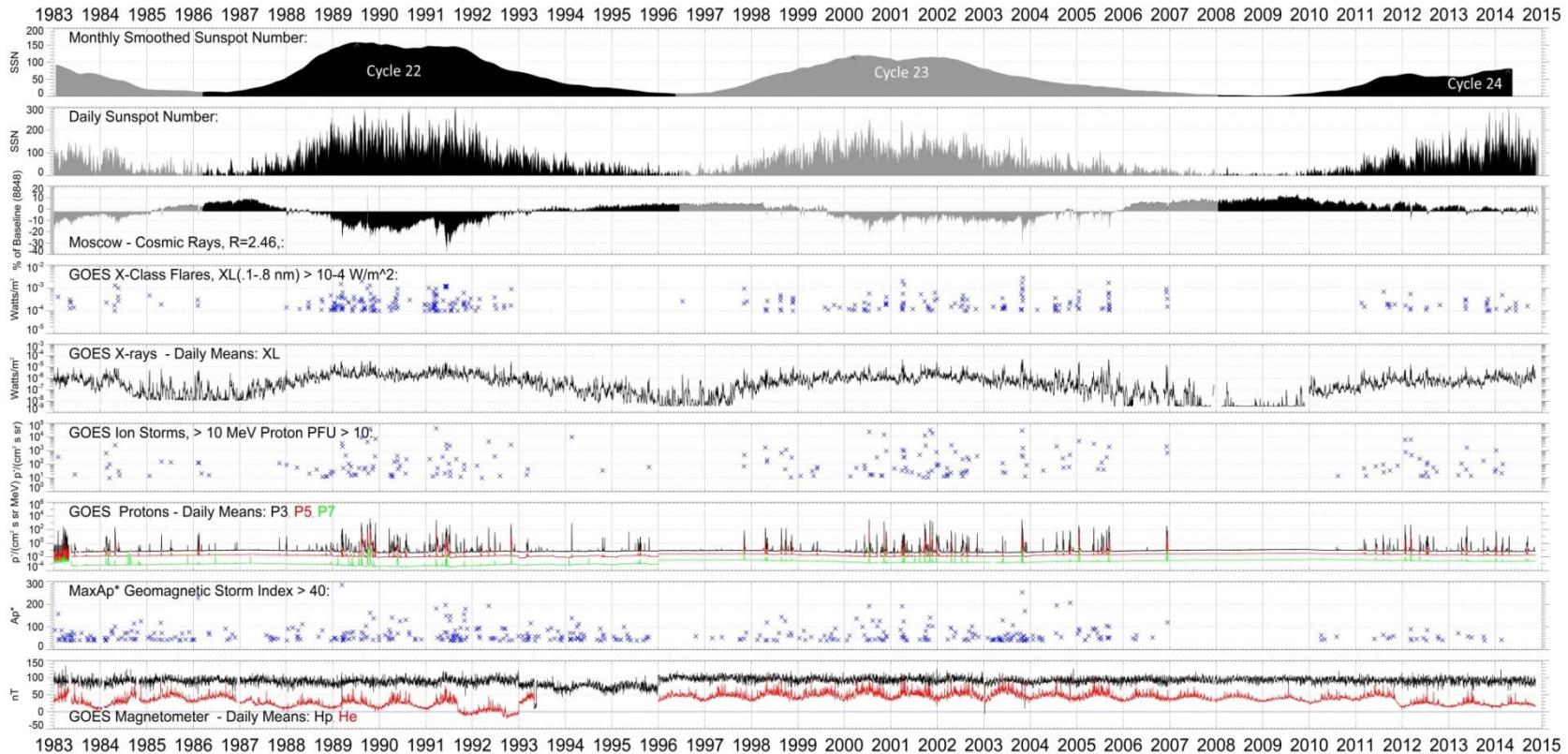
- GOES I-M / NOP / RSTU
- POES/MetOp
- DSCOVR
- TSIS
- DMSP



# Space Weather Team

## Managing NOAA's SWx Satellite Data

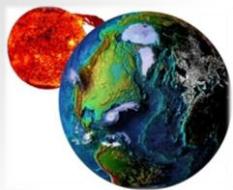
Space Environment Overview: 1983-01-01 - 2014-12-31



	Start Date	Max Date	End Date	C-Class Flares	M-Class Flares	X-Class Flares	Ion Storms	Mag Storms Ap* > 40
Solar Cycle 22	1986-03	1989-07	1996-06	12,447	2,021	151	73	191
Solar Cycle 23	1996-06	2000-03	2008-01	13,102	1,437	126	92	158
Solar Cycle 24 *	2008-01	2014-04	TBD	5,288	488	35	32	25

- We are far from the end of Solar Cycle 24 so these numbers should be considered a progress report rather than a final grade.
- Event totals are through November 2014.

<http://www.ngdc.noaa.gov/stp/satellite/goes/index.html>



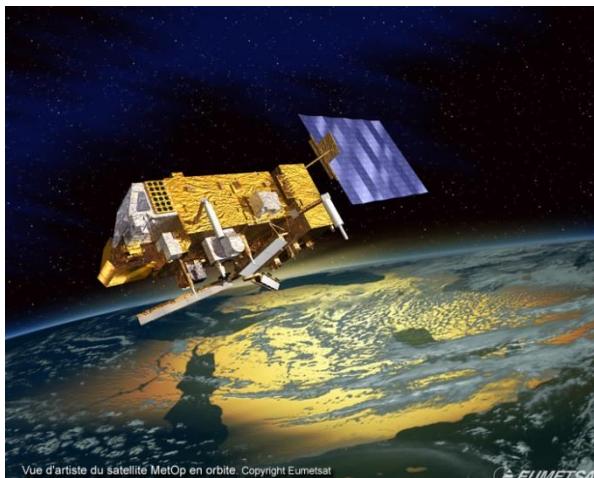
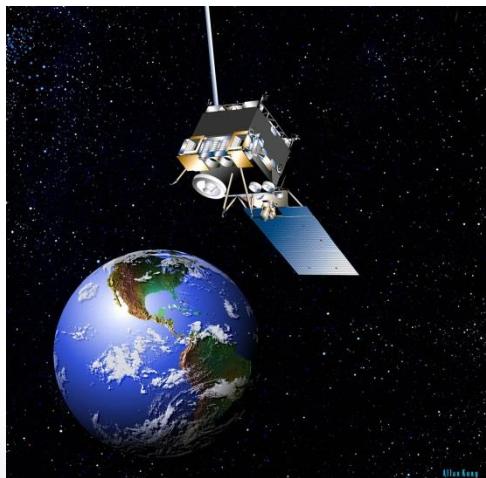
# Space Weather Team

## Web Statistics: Monthly Satellite Data Usage

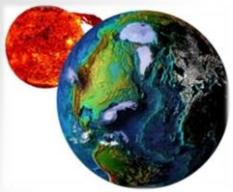
### Statistics for January 2015

Space Weather Data	# of Requests	Total Volume (GB)
GOES SEM	3,376,866	329.6
GOES SXI	416,778	333.3
POES/MetOp SEM	823,403	46.47
DMSP	1,230,713	130.8

Over 10% of all JGR-Blue (Space Physics) publications use GOES data



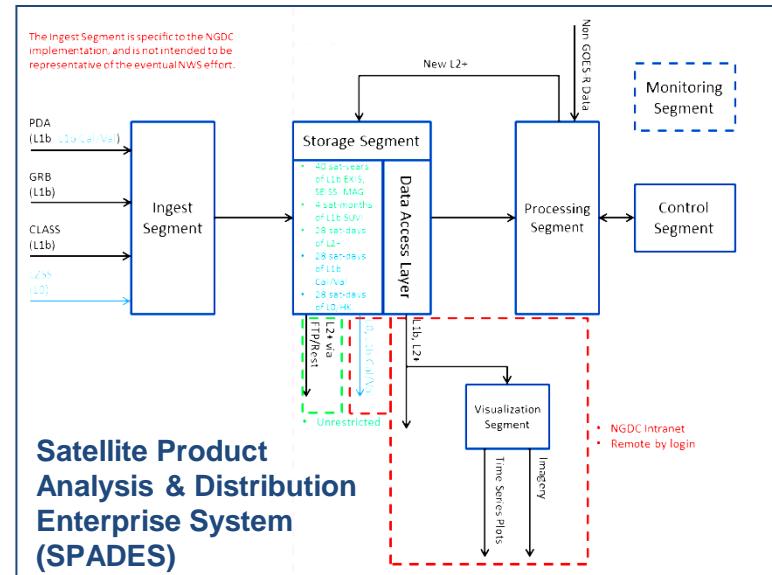
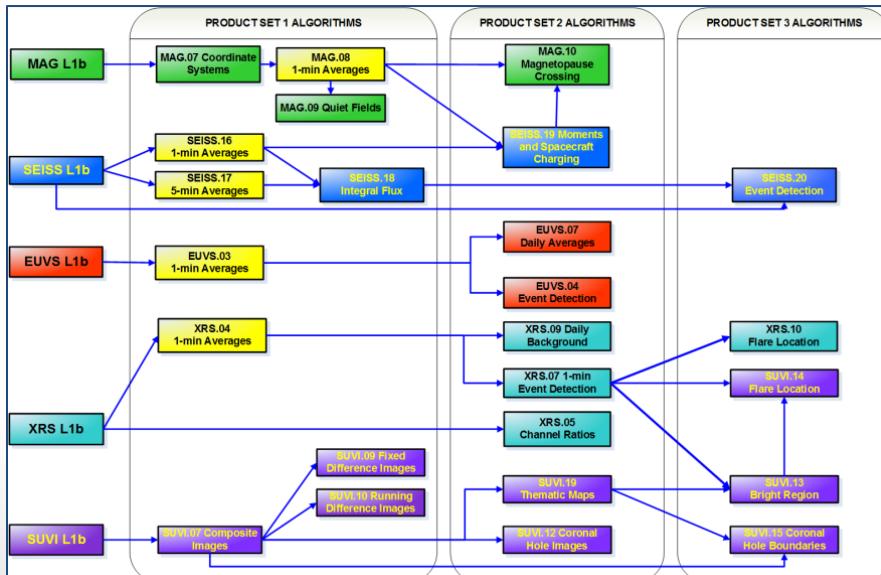


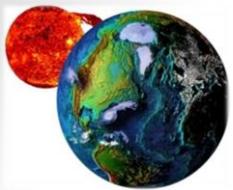


# Space Weather Team

## GOES-R – Assigned Responsibility

- Vendor oversight, including calibration
- Pre-launch technical planning
- Post-Launch tests & product assessment
- L1b product calibration/validation
- L2+ algorithm development & demonstration
- Long-term Operations & Maintenance (O&M)
- Data stewardship / archive



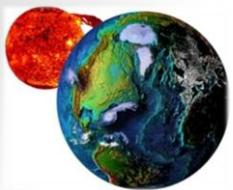


# Space Weather Team

## Status: GOES-R Status – History

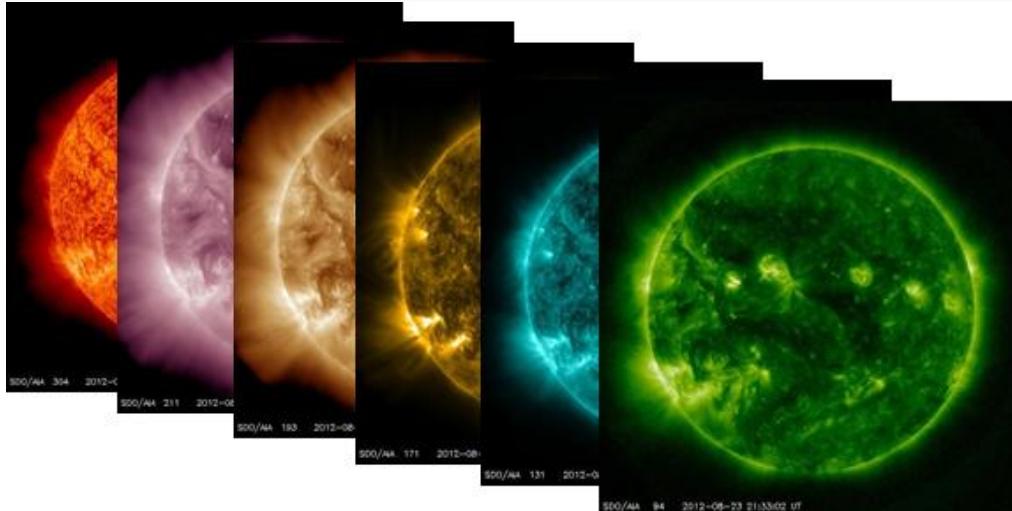


	1QFY15	4QFY14	3QFY14	2QFY14	1QFY14
EXIS	H/W G	G	G	G	G
	L1b G	G	G	G	G
	L2+ G	G	G	G	G
MAG	H/W Y/G	Y/G	Y/G	Y/G	Y/G
	L1b R/Y	R/Y	R/Y	R/Y	R/Y
	L2+ G	G	G	G	G
SEISS	H/W Y	Y/G	Y/G	Y/G	Y/G
	L1b G	G	G	G	G
	L2+ G	G	G	G	G
SUVI	H/W G	G	G	G	G
	L1b G	G	G	G	G
	L2+ G	G	G	G	G
Products	L0 Y/G	Y/G	Y/G	Y/G	Y
	L1b Y	Y	Y	Y	Y
	L2+ Y	Y	Y	Y	R
Access	PDA, SPADES Y/G	Y	Y/G	Y	G
	GRB, SPADES Y/G	Y/G	Y/G	Y	G
	CLASS G	G	G	G	G
	SPADES G	G	G	G	Y
	GRB&PDA, PLT R	R	R		

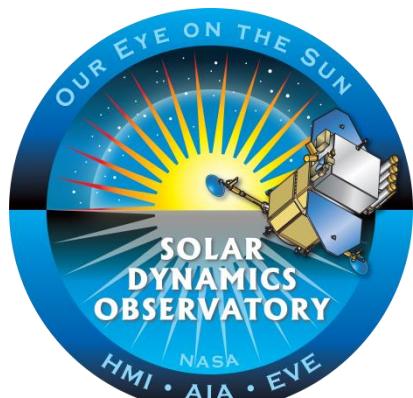


# Space Weather Team

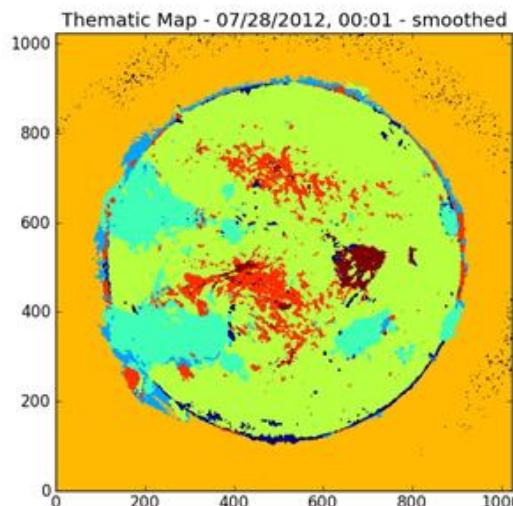
## GOES-R Cal-Val: SUI Solar Thematic Maps



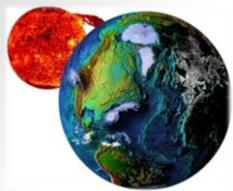
Pixels are classified from probability distributions created from training sets using all six bandpasses.



The SDO/AIA is the heritage sensor for SUI

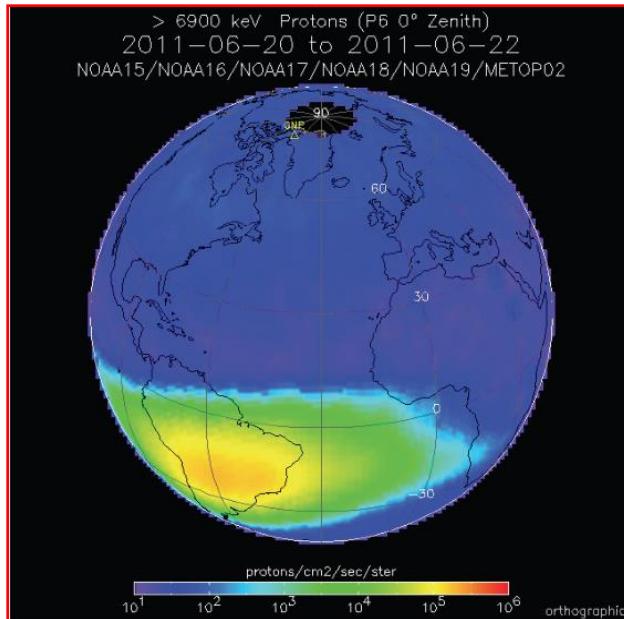


- Coronal Hole
- Prominence / Filament Space
- Corona Quiet Bright Regions
- Corona off-disk
- Flare
- Coronal Hole off-disk



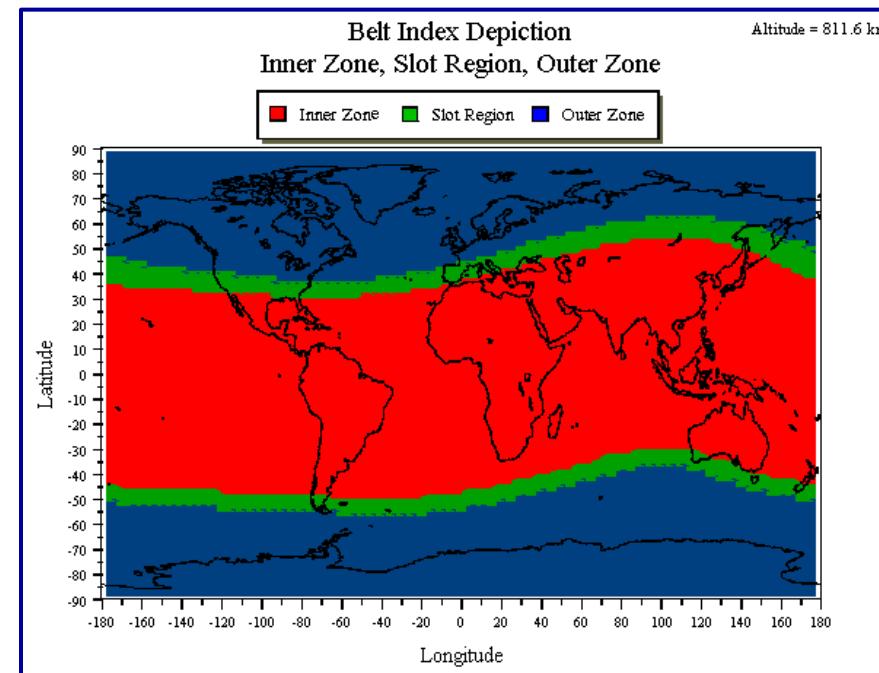
# Space Weather Team

## POES/MetOp SEM: Processing & New Products

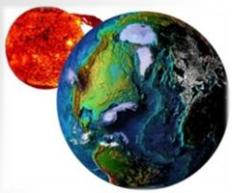


### Space Environment Monitor (POES/MetOp)

- **Roles and Responsibilities:**
  - ✓ Real-time Data Processing
  - ✓ Daily “Belt Indices” (AFWA)
  - ✓ Archive and Dissemination
  - ✓ Satellite Anomaly Resolution



<http://www.ngdc.noaa.gov/stp/satellite/poes/index.html>



# Space Weather Team

## DSCOVR: Data Stewardship

**Launch:** 11 February 2015

**Status:** Early-orbit ops (all nominal)

**Final Location:** 1,500,000 km (L1)

**Operations:** L+105 days

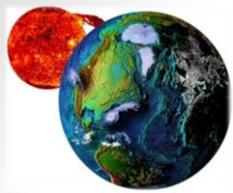
### Space Weather Sensor Suite

- Plasma-Magnetometer (PlasMag) measures solar wind for space weather predictions.



### Deep Space Climate Observatory (DSCOVR)





# Space Weather Team

## Initiative: Satellite Anomaly Program



### Case 1 – Galaxy-15

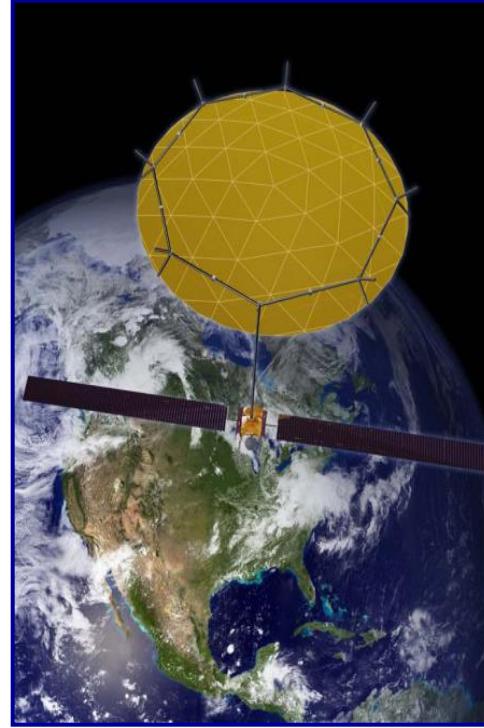
Orbit: Geosynchronous

Anomaly Date:

05 April 2010 @09:48

Probable Cause:

***Internal Charging/ESD Report***



### Case 2 – SkyTerra-1

Orbit: Geosynchronous

Anomaly Date:

07 March 2012 @14:43

Probable Cause:

***Single-Event Upset Report***



### Case 3 – NPP/VIIRS

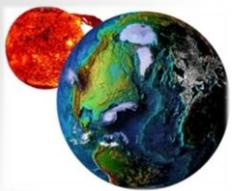
Orbit: Polar LEO

Anomaly Date:

Various

Probable Cause:

***Single-Event Upsets Report***



# Ionospheric Sounding Team

***Mission:*** Develop and Field Revolutionary Technologies for Advanced Ionospheric Sounding

NGDC innovated the new-technology Vertical Incidence Pulsed Ionospheric Radar (VIPIR)

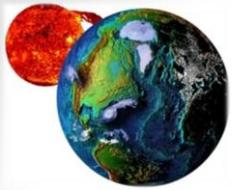
## Actions:

- Acquire & disseminate to SWPC/AFWA real-time, ionospheric soundings from a global network of ground sensors. Data also disseminated to domestic and international partners.
- Demonstrate advanced capabilities for ionospheric sounding by VIPIR.
- Field new ground-based sensors in U.S., Africa and the Antarctic.
- Manage 70+ years of ionospheric sounding data. Key to understanding climate change impacts to geospace.



## Recent/Ongoing Activities:

- Supported NASA Sounding Rocket Program.
- Install new Korean VIPIR at Jang Bogo Station, Antarctica
- Continued support to the Low latitude Ionospheric Sounding Network (LISN)



# Ionospheric Sounding Team

## Field Campaign: Deploy New Generation Sensor

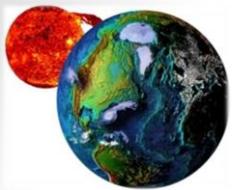
**Sensor:** Vertical Incidence Pulsed Ionospheric Radar (VIPIR)

**Location:** Jang Bogo Station (South Korea), Antarctica



NESDIS News: [http://www.nesdis.noaa.gov/news\\_archives/ionosphere.html](http://www.nesdis.noaa.gov/news_archives/ionosphere.html)

Antarctic Blog: <http://ciresblogs.colorado.edu/spaceweather/>



# WDS for Geophysics

**Mission:** Acquire, Manage, and Disseminate Solar-Terrestrial Data as a Member of the World Data Service

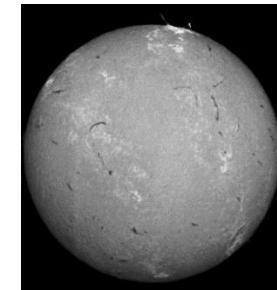
NGDC is responsible for a variety of environmental datasets from the sun's surface to the upper atmosphere

## Actions:

- Preserve NOAA's historical solar/space environmental datasets and products (non-satellite).
- Acquire processed environmental datasets from solar observatories and the INTERMAGNET consortium.
- Manage and publish solar and geomagnetic indices from the 1600's to the present.
- Create metadata records for solar-terrestrial datasets in compliance with the ISO 19115 standard.

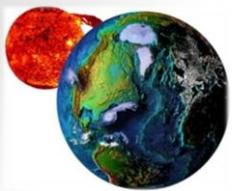


Historical H<sub>α</sub> photos from the Boulder Solar Observatory (1967 – 1994) and other relevant datasets



Monthly Geophysical & Solar Indices Bulletins (pre 1985 – present) and other historical reports





# Earth Observation Group

**Mission:** *Global Mapping of Nighttime Lights and Combustion Sources Using VIIRS Imagery Data*

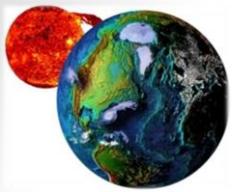
Multispectral VIIRS detections are used to map lights and combustion sources worldwide

## Actions:

- Construct research quality monthly & annual maps of nighttime lights – change detection, socio-economic and ecological studies.
- Provide nightly, global data on the location, temperature, source size and radiant heat of infrared emitters such as gas flares, biomass burning, volcanos and industrial sites.
- Detect and characterize anomalous events worldwide.

Visible Infrared Imaging Radiometer Suite (VIIRS)





# Earth Observation Group

## NPP VIIRS: Supporting Disaster Recovery

### Lac-Magantic Train Derailment

First Report: 06-Jul-2013 @ 05:15 UTC

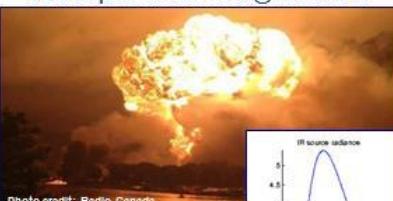
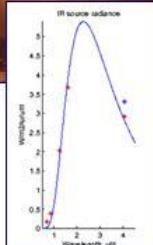


Photo credit: Radio-Canada

Latitude 45.58 Longitude: -70.88  
Time: 06-Jul-2013 06:24:48  
Cloud state: clear

Combustion parameters

- Temperature: 1,274 °K
- Radiant heat intensity: 58.64 W/m<sup>2</sup>
- Radiant heat: 47.19 MW
- Source footprint: 315.91 m<sup>2</sup>



Quebec City

### Natural Gas Platform Blaze

Fire broke out on the Hercules 266 gas platform around 10:50 p.m. (CDT) on 23 Jul 2013. The platform is located around 55 miles off the Louisiana coast in the Gulf of Mexico. The blaze was detected by the NPP VIIRS at 02:33 on 24 Jul and processed by the EOG real-time system with data available online by 04:26.

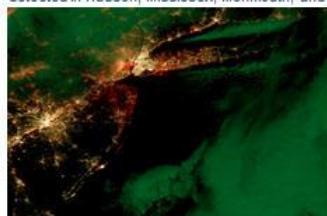
Combustion parameters:  
Source: Hercules\_266\_Light\_0723102724, 07731420\_e0733092\_IR\_source\_26  
Lat:39.391493 Long: -90.529130 deg.  
Temperature:1402 deg. K  
Radiant heat: 10.00 MW  
Source footprint: 30.00 m<sup>2</sup>



NGDC POC: Chris Elvidge

### Hurricane Sandy Power Outages

Color-composite image from the VIIRS day/night band (DNB) data reveals the locations along the Atlantic seaboard experiencing power outages on the morning of November 1. In the color composite, areas where lighting was not detected are red and partial outages are shown as orange compared to the golden color for normal lighting conditions. Clouds in the image appear as green. Note that clouds are obscuring lights in many areas, but the central area damaged by Sandy are largely free of clouds. In New York State power outages were detected in Lower Manhattan, Staten Island, and Long Island. In New Jersey power outages were detected in Hudson, Middlesex, Monmouth, and Ocean Counties.



VIIRS DNB Image: 01 Nov 12  
Power Outage Product

Hurricane Sandy  
SIGNIFICANT WIND IMPACT  
58 mph +

### Mount Sakurajima Eruption

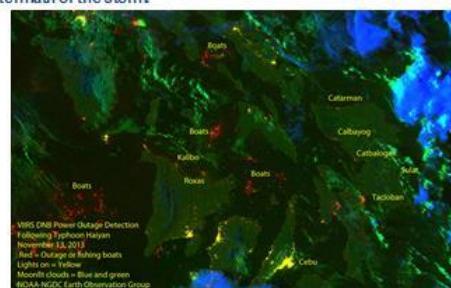
At 16:31 (local time) on 18 Aug 2013 the Japanese volcano had a significant eruption resulting in a 5,000-m ash column. At darkness and significant ash falls on the central part of the volcano's thermal anomaly was detected by the Radiometer Suite (VIIRS) fourteen hours before the eruption. The detection temperature was 818 °K with a source footprint of 330 m<sup>2</sup>.



Combustion parameters  
Source: KH-SAKI\_0491, 021308017\_0100324\_e165620\_IR\_source\_3  
Lat:31.577387 Long:130.507918 deg.  
Temperature:818 deg. K  
Radiant heat: 10.00 MW  
Source footprint:330 m<sup>2</sup>  
Combustion parameters  
Time:17-Aug-2013 05:51:37

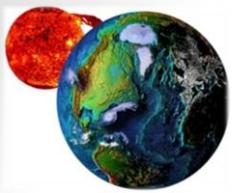
### Typhoon Haiyan Power Outage

Haiyan, the largest tropical cyclone ever recorded, struck the Philippines on Thursday evening, November 7, (U.S. time) impacting 25 million people. The Category 5 super storm harbored winds of up to 195 mph along with torrential rain, causing massive destruction and 6,300 deaths. The EOG used the VIIRS DNB to detect power outages in the aftermath of the storm.



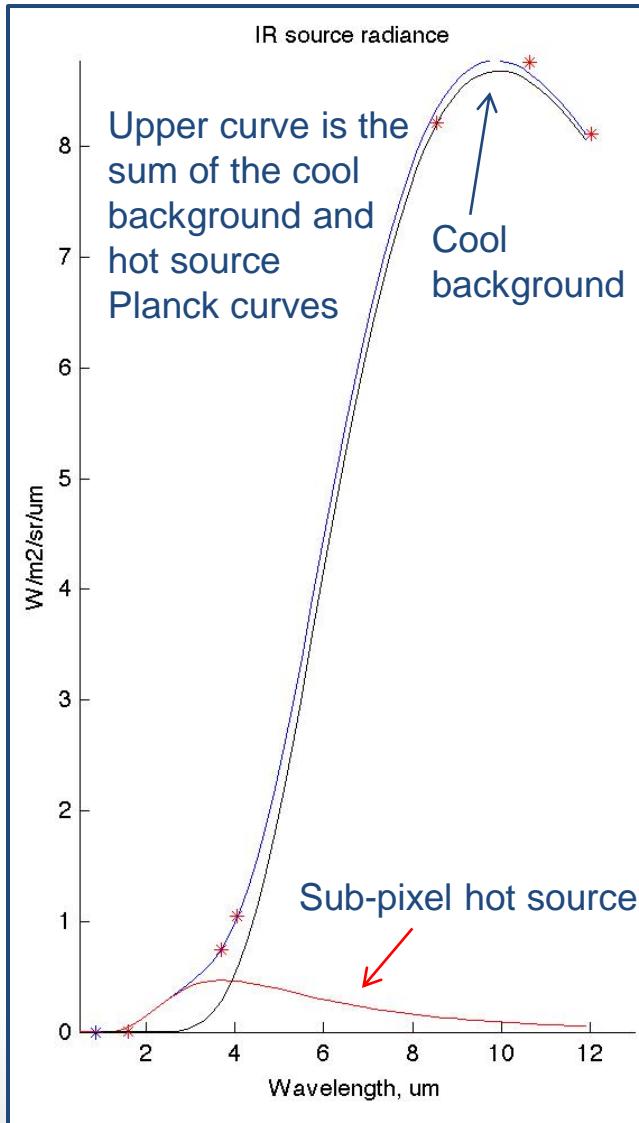
VIIRS DNB Power Outage Detection  
Following Typhoon Haiyan  
November 12, 2013  
Red = Outage or fishing boats  
Lights on = Yellow  
Municipalities in blue and green

NOAA/NESDIS Earth Observation Group



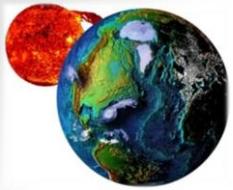
# Earth Observation Group

## VIIRS NightFire: Monitoring Global Gas Flaring



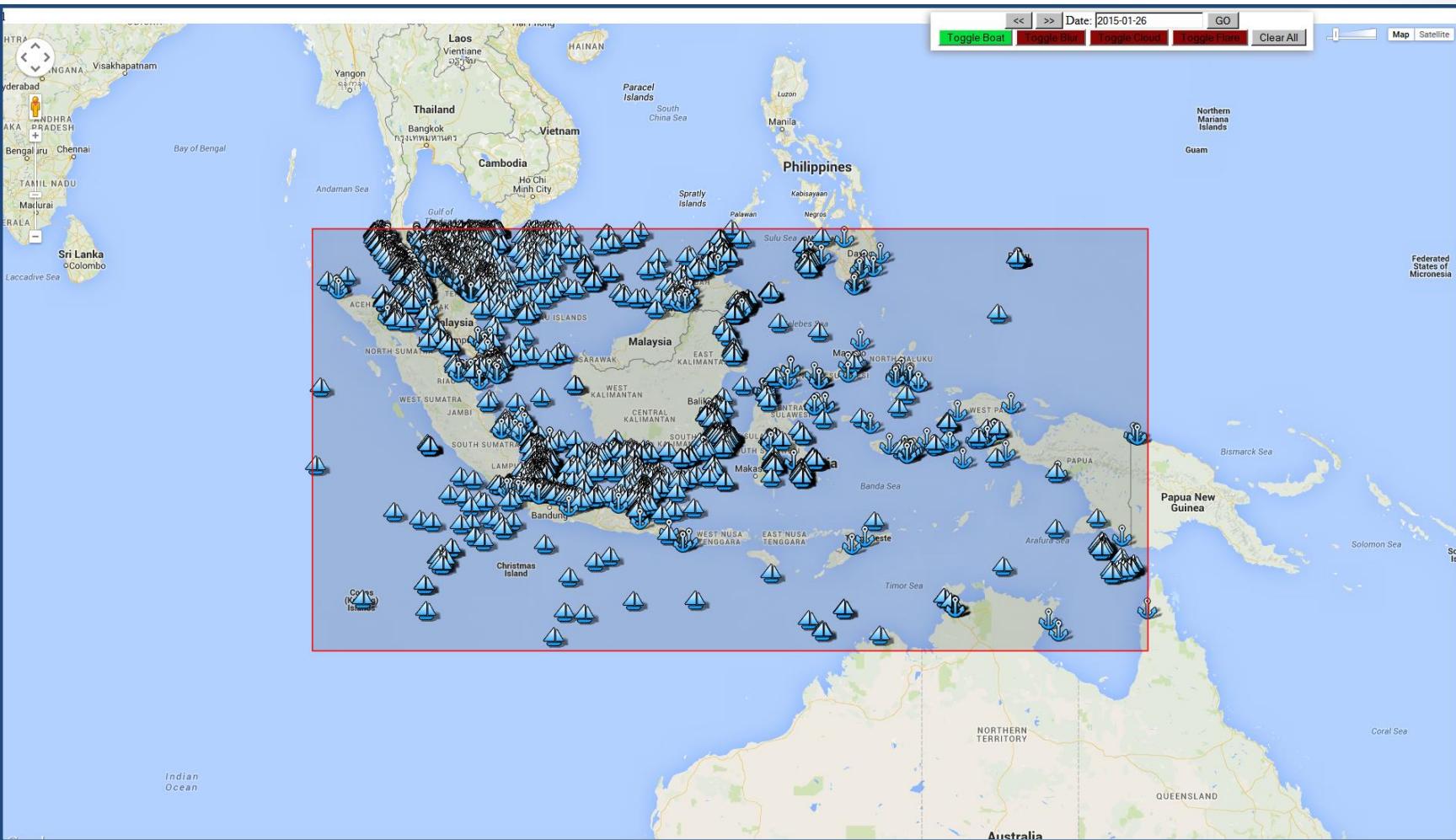
A dual Planck curve fitting algorithm has been implemented in Nightfire<sup>1</sup>. Radiances in the long wave channels define the fit for the background. Radiances in the short-wave channels define the fit for the sub-pixel hot source. The result are estimates for the hot source temperature, source size and radiant heat.



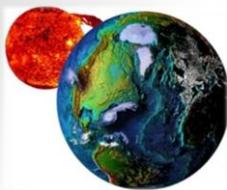


# Earth Observation Group

## VIIRS DNB: Monitoring Fishing Compliance



Demo (Under Development)



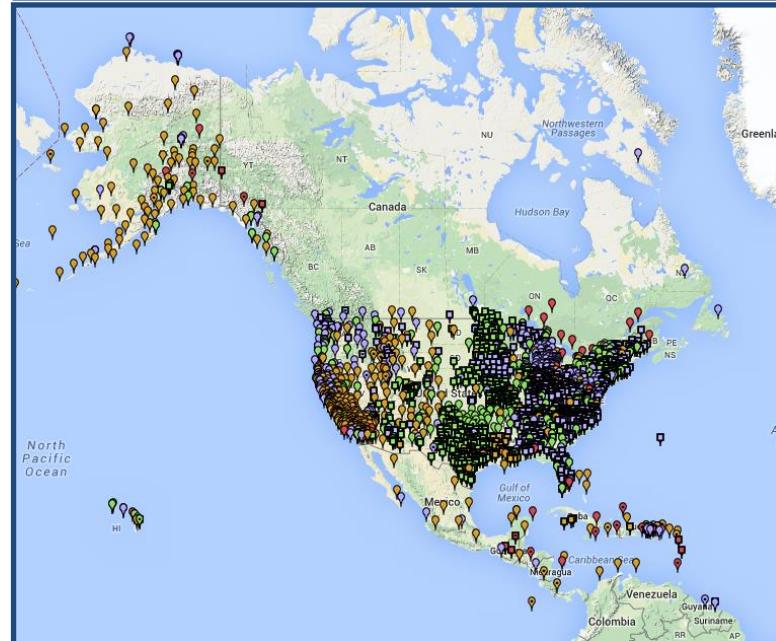
# CORS Team

**Mission:** *Maintain the Parallel Data Collection and Distribution Site for the NGS Continuously Operating Reference Stations (CORS)*

Manage and operate the CORS-West facility as an element of the NGS Continuity Of Operations Plan (COOP)

## Actions:

- Acquire, process and distribute GPS receiver data from over 1900 ground-based sites.
- Provide real-time GPS data to the NWS/SWPC for the real-time U.S. Total Electron Content (USTEC) ionospheric model and to the ESRL/GSD Ground-Based GPS Meteorology Integrated Precipitable Water Vapor (IPW) model.
- Integrate CORS data into CLASS as the pathfinder for archiving all NGDC datasets.



CORS Coverage (2015)



# OUTLINE

## Solar & Terrestrial Physics Division

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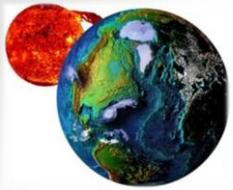
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End

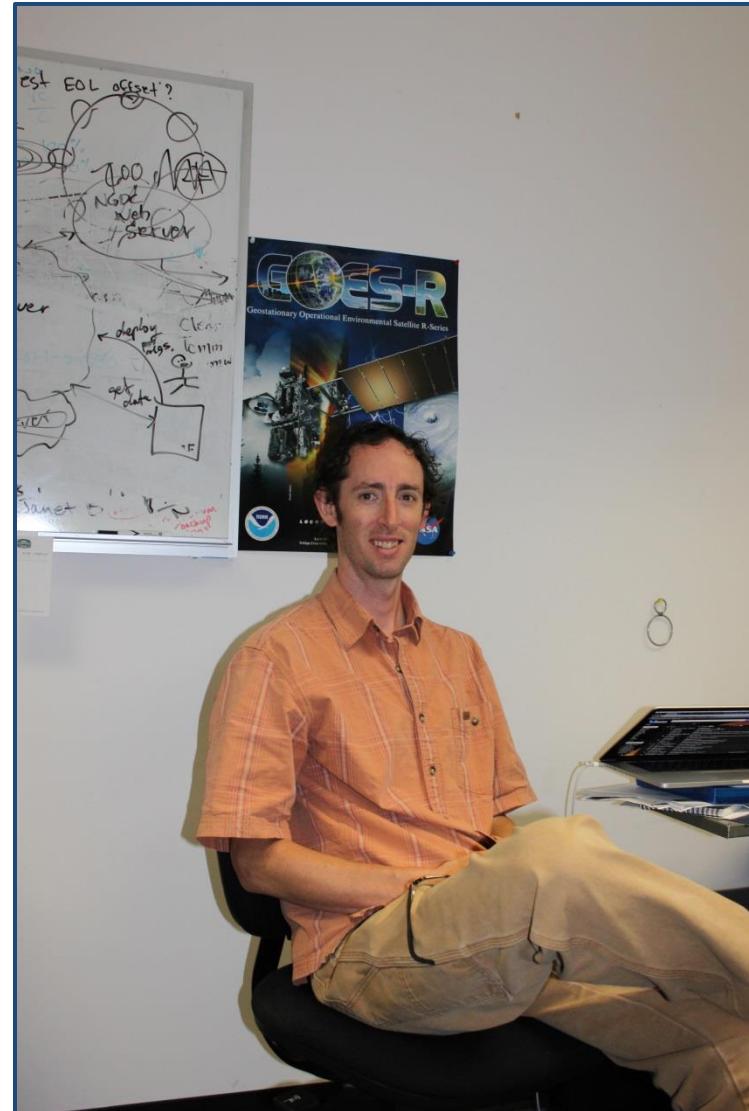


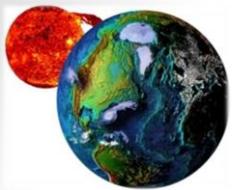
# Personnel Achievements

## NOAA Employee of the Month



Dr. Rob Redmon was selected as the NOAA Employee of the Month for July 2014. *"In recognition and appreciation of a NOAA employee who has made significant contributions to the agency and has demonstrated exceptional and sustained effort toward accomplishing our mission."*





# Personnel Achievements

## NOAA Affiliate of the Month

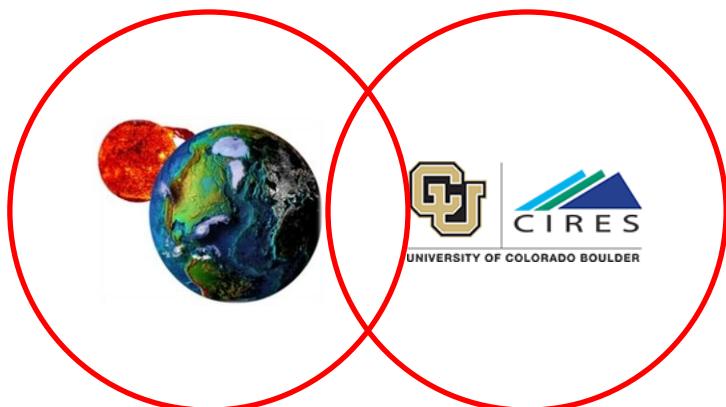
Dr. Juan Rodriguez

NOAA Affiliate of the Month

November 2014

Cited for

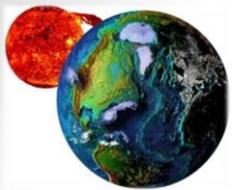
“Outstanding support of NOAA's  
space weather mission”



October 31, 2014

CIRES' Juan Rodriguez, NOAA team member of the month





# Personnel Achievements

## WDS Data Stewardship Award

Dr. Rob Redmon  
WDS Data Stewardship Award  
2014

Cited for

*“Exceptional contributions to the improvement  
of scientific data stewardship  
by early career researchers”*

Also

Notification of Rob's award  
included as a [news item](#) in the  
Space Weather Journal

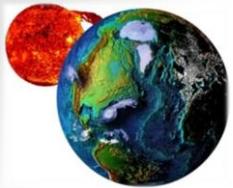
Rob received his award at the SciDataCon 2014,  
Jawaharlal Nehru University Convention Centre, New  
Delhi, India (November 2014)



## SciDataCon 2014

International Conference on  
Data Sharing and Integration for Global Sustainability





# Personnel Achievements

## Future NOAA Constituents



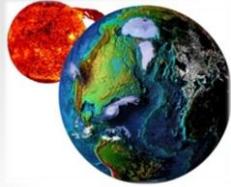
**Sahari Ghosh**



**Sylvia Reed Darnel**



**Liam Fletcher Rowland**



# OUTLINE

## Solar & Terrestrial Physics Division

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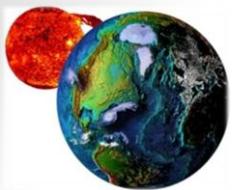
STP Division Overview

Technical Teams

Personnel Accomplishments

→ Division Publications

End



# STP Publications

## 2014 – 2015 (YTD) [Pg 1 of 4]

### Publications (2014-2015/YTD):

Alken, P., S. Maus, H. Lühr, **R.J. Redmon**, F. Rich, B. Bowman, and S. M. O'Malley (2014), Geomagnetic main field modeling with DMSP, *J. Geophys. Res. Space Physics*, 119, 4010–4025, doi:10.1002/2013JA019754. [\[Peer reviewed\]](#)

Asefi-Najafabady S., P. J. Rayner, K. R. Gurney, A. McRobert, Y. Song, K. Coltin, J. Huang, **C. Elvidge** and **K. Baugh** (2014) A multiyear, global gridded fossil fuel CO<sub>2</sub> emission data product: Evaluation and analysis of results. *Journal of Geophysical Research – Atmospheres*. Published online September 10, 2014. DOI: 10.1002/2013JD021296 [\[Peer reviewed\]](#)

Bordikar, M.R., W.A. Scales, A. Mahmoudian, H. Kim, P.A. Bernhardt, **R. Redmon**, A.R. Samimi, S. Brzciński, and M.J. McCarrick (2014), Impact of active geomagnetic conditions on stimulated radiation during ionospheric second electron gyroharmonic heating, *J. Geophys. Res. Space Physics*, 119, pp. 548–565, doi:10.1002/2013JA019367. [\[Peer reviewed\]](#)

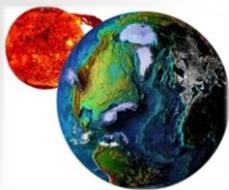
Chowdhury, S., T. Shipman, D. Chao, **C.D. Elvidge**, **M. Zhizhin** and **F-C Hsu** (2014), Daytime Gas Flare Detection using Landsat-8 Multispectral, Proc. IGRASS 2014 / 25th Canadian Symposium on Remote Sensing, 13-18 July 2014, Quebec, Canada.

**Denig, W. F.** (2015), The International Council for Science World Data System Stewardship Award 2014 Presented to Dr. Robert Redmon of the National Geophysical Data Center, *Space Weather*, 13, doi:10.1002/2014SW001136.

**Denig, W.F., R.J. Redmon, J.V. Rodriguez, and J.H. Allen (2014)**, "Book Report: "Satellite Anomalies - Benefits of a Centralized Database and Methods for Securely Sharing Information Among Satellite Operators" by David A Galvan, Brett Hemenway, William Welser IV and Dave Baiocchi", *Space Weather Journal*, Accepted 31 Jul 14.

**Feng-Chi, Hsu, Kimberly Baugh, Tilottama Ghosh, Mikhail Zhizhin, and Christopher Elvidge:** DMSP-OLS Radiance Calibrated Nighttime Lights Time Series with Inter-Calibration, *Remote Sensing*, 2014 (Accepted) [\[Peer reviewed\]](#)

Hartley, D.P., M.H. Denton, and **J.V. Rodriguez** (2014), Electron Number Density, Temperature and Energy Density at GEO and Links to the Solar Wind: A Simple Predictive Capability, *J. Geophys. Res.*, 119, pp. 4556-4571. doi:10.1002/2014JA019779 [\[Peer reviewed\]](#)



# STP Publications

## 2014 – 2015 (YTD) [Pg 2 of 4]

### Publications (continued):

Hudson, M.K., J. Paral, **B.T. Kress**, M. Wiltberger, D.N. Baker, J.C. Foster, D.L. Turner and J.R. Wygant (2015), Modeling CME-shock driven storms in 2012 – 2013: MHD-test particle simulations, *J. Geophys. Res.*, Accepted manuscript online, DOI: 10.1002/2014JA020833. [[Peer Reviewed](#)]

Ieda, A., S. Oyama, H. Vanhamaki, R. Fujii, A. Nakamizo, O. Amm, T. Hori, M. Takeda, G. Ueno, A. Yoshikawa, **R. J. Redmon**, **W. F. Denig**, Y. Kamide and N. Nishitani (2014), Approximate forms of daytime ionospheric conductance, *J. Geophys. Res.*, 119. DOI: 10.1002/2014JA020665 [[Peer Reviewed](#)]

Knipp, D.J., T. Matsuo, L. Kilcommons, A. Richmond, B. Anderson, H. Korth, **R. Redmon**, B. Mero, and N. Parrish (2014), Comparison of Magnetic Perturbation Data from LEO Satellite Constellations: Statistics of DMSP and AMPERE, *Space Weather*, 12, pp. 2–23, doi:10.1002/2013SW000987. [[Peer Reviewed](#)]

Li, Z., R.M. Millan, M.K. Hudson, L.A. Woodger, D.M. Smith, Y. Chen, R. Friedel, **J.V. Rodriguez**, M.J. Engebretson, J. Goldstein, J.F. Fennell and H.E. Spence (2014), Investigation of EMIC Wave Scattering as the Cause for the BARREL 17 January 2013 Relativistic Electron Precipitation Event: A Quantitative Comparison of Simulation with Observations, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL062273. [[Peer Reviewed](#)]

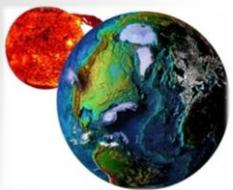
Meredith, N.P., R.B. Horne, J.D. Isles and **J.V. Rodriguez** (2015), Extreme Relativistic Electron Fluxes at Geosynchronous Orbit: Analysis of GOES  $E > 2$  MeV Electrons, *Space Weather*, accepted. [[Peer Reviewed](#)]

Muzamil, F.M., C.J. Farrugia, R.B. Torbert, P.R. Pritchette, F.S. Mozer, J.D. Scudder, C.T. Russell, P.E. Sandholt, **W.F. Denig** and L. Wilson III (2014), Structure of a reconnection layer poleward of the cusp: Extreme density asymmetry and a guide field, *J. Geophys. Res.* (accepted 19-Aug-14). [[Peer Reviewed](#)]

**Redmon, R. J.**, W. K. Peterson, L. Andersson, P. G. Richards, and A. W. Yau (2014), An assessment of the role of soft electron precipitation in global ion upwelling, *J. Geophys. Res. Space Physics*, 119, 7665–7678, doi:10.1002/2014JA020061 [[Peer Reviewed](#)]

Rice, D. D., J. J. Sojka, J. V. Eccles, **R. Redmon**, and R. D. Hunsucker (2014), Characterizing the pre-Space Age ionosphere over Washington, DC, *Radio Sci.*, 49, 616–629, doi:[10.1002/2014RS005427](https://doi.org/10.1002/2014RS005427). [[Peer Reviewed](#)]

**Rodriguez, J.V.**, J.C. Krosschell and J.C. Green (2014), Intercalibration of GOES 8-15 Solar Proton Detectors, *Space Weather*, 12, 92-109. doi: 10.1002/2013SW000996. [[Peer reviewed](#)]



# STP Publications

## 2014 – 2015 (YTD) [Pg 3 of 4]

### Publications (continued):

**Rodriguez, J.V.**, and T.G. Onsager (2014), Solar Energetic Particle Measurements Intercalibration Workshop, 11 April 2014, *Space Weather*, 12, 129–130, doi:10.1002/2014SW001048.

**Rodriguez, J.V.**, T.G. Onsager, D. Heynderickx, and P. T. A. Jiggens (2014), Meeting Report: Solar Energetic Particle Measurements Intercalibration Workshop, 11 April 2014, Boulder, Colorado, *Space Weather*, 12, 613-615, doi: 10.1002/2014SW001134.

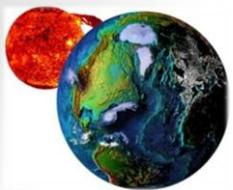
Sandholt, P.E., C.J. Farrugia and **W.F. Denig** (2014), M-I Coupling Across the Auroral Oval at Dusk and Midnight: Repetitive Substorm Activity Driven by Interplanetary Coronal Mass Ejections (CMEs), *Ann. Geophys.*, 32, 333-351. doi: 10.5194/angeo-32-333-2014 **[Peer Reviewed]**

Sergeev, V.A., A.V. Nikolaev, M.V. Kubyshkina, N.A. Tsyganenko, H.J. Singer, **J.V. Rodriguez**, V Angelopoulos, R. Nakamura, S.E. Milan, J.S. Coxon, B.J. Anderson, and H. Korth (2014), Event Study Combining Magnetospheric and Ionospheric Perspectives of the Substorm Current Wedge Modeling, *J. Geophys. Res.*, 119, doi:10.1002/2014JA020522. **[Peer Reviewed]**

Simon Wedlund, M., M.A. Clilverd, C.J. Rodger, K. Cresswell-Moorcock, N. Cobbett, P. Breen, D. Danskin, E. Spanswick, and **J.V. Rodriguez** (2014), A Statistical Approach to Determining Energetic Outer Radiation Belt Electron Precipitation Fluxes, *J. Geophys. Res.*, 119, pp. 3961–3978. doi:10.1002/2013JA019715 **[Peer reviewed]**

Snow, M., M. Weber, **J. Machol**, R. Viereck and E. Richard (2014) Comparison of Magnesium II Core-to-Wing Ratio Observations During Solar Minimum 23/24, *J. Space Weather Space Clim.*, 4, A04, doi:10.1051/swsc/2014001. **[Peer reviewed]**

Straka, W.C., III; C.J. Seaman, **K. Baugh**, K. Cole, E. Stevens, S.D. Miller (2015), Utilization of the Suomi National Polar-Orbiting Partnership (NPP) Visible Infrared Imaging Radiometer Suite (VIIRS) Day/Night Band for Arctic Ship Tracking and Fisheries Management. *Remote Sens.* 2015, 7, 971-989. **[Peer reviewed]**



# STP Publications

## 2014 – 2015 (YTD) [Pg 4 of 4]

### Publications (continued):

Turner, D.L., V. Angelopoulos, S.K. Morley, M.G. Henderson, G.D. Reeves, W. Li, D.N. Baker, C.-L. Huang, A. Boyd, H.E. Spence, S.G. Claudepierre, J.B. Blake and **J.V. Rodriguez** (2014), On the Cause and Extent of Outer Radiation Belt Losses During the 30 September 2012 Dropout Event, *J. Geophys. Res.*, 119, pp. 1530–1540, doi:[10.1002/2013JA019446](https://doi.org/10.1002/2013JA019446). [**Peer Reviewed**]

Tuttle, B.T., S. Anderson, **C. Elvidge, T. Ghosh, K. Baugh**, P. Sutton (2014), Aladdin's Magic Lamp: Active Target Calibration of the DMSP OLS. *Remote Sens.* 2014, 6, 12708-12722. [**Peer reviewed**]

Verkhoglyadova, O. P., A. J. Mannucci, B. T. Tsurutani, M. G. Mlynczak, L. A. Hunt, **R. J. Redmon**, and J. C. Green (2015), Localized thermosphere ionization events during the high-speed stream interval of 29 April to 5 May 2011, *J. Geophys. Res. Space Physics*, 120, doi:[10.1002/2014JA020535](https://doi.org/10.1002/2014JA020535). [**Peer reviewed**]

Woods, T., R. Cahalan, **W. Denig**, G. Kopp, P. Pilewskie and T. Sparn (2014), New Space Measurements Extend Sun-Climate Record, *EOS*, 95, pp. 429-430 [**Peer Reviewed**]

Yuyu Zhou, Y., S.J. Smith, **C.D. Elvidge**, K. Zhao, A. Thomson and M. Imhoff (2014), A Cluster-based Method to Map Urban Area from DMSP/OLS Nightlights, *Remote Sensing of Environment*, 147, pp. 173-185. [**Peer reviewed**]

Total accepted or published: 29  
**Peer Reviewed: 24**



# OUTLINE

## Solar & Terrestrial Physics Division

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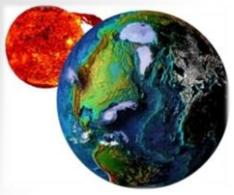
STP Division Overview

Technical Teams

Personnel Accomplishments

Publications and Presentations

→ End



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